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(54) BANDAGING MATERIAL AND PROCESS FOR ITS PRODUCTION

(71) We, BUNZL & BIACH AKTIENGESELLSCHAFT, an Austrian Company of Wien 11., Engerthstrasse 161—163, Austria, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to absorbent bandaging materials which do not adhere to the wound, and to a process for producing them.

The present invention provides bandaging material comprising one or more layers of cellulosic material, or of fleecy material (which may comprise cellulosic material), coated on the side for placing next to the wound with a porous non-adhesive layer of acrylic resin which contains a substance which kills or controls the growth of germs, the said layer or layers being backed with a layer of absorbent or strengthening material.

The germ-killing substance may comprise one or more of zinc oxide, aluminium oxide, aluminium powder and silver powder. Preferably, the acrylic resin coating includes a dispersing agent. In a preferred form, the bandaging material comprises a layer of fleecy material which comprises a reinforced fibrous gauze, of thickness 0.02 to 0.05 mm and weight per square metre of 12 to 60 g, of hydrophilic and/or hydrophobic fibres of 1.5 to 15 den.

The bandaging material may be attached to the backing layer of absorbent or strengthening material over the whole area of the bandaging material or in sections by stitching, welding or sticking. If the bandaging material comprises a layer formed from hydrophilic fibres, the acrylic resin coating on the individual fibres makes these fibres hydrophobic, but the intervals between the fibres are retained and there are therefore still plenty of spaces for the secretion from the wound to seep through. Hydrophobic fibres may, however, also be used for the bandaging material, possible materials being for example, polyamide, polyester, polyolefin and other plastics, but also cellulose fibres which are made hydrophobic, for example, by the addition of a coating of silicone resin.

It is, of course, possible—though not always necessary—to pre-treat the cellulose employed before adding the layer of acrylic resin. Pre-treatment of this kind might, for example, consist of impregnation with pure acrylic resin emulsion or solution, which strengthens the layers of cellulose mechanically without adversely affecting their perviousness to air or moisture. Pre-treatment may also involve impregnation with a hydrophobic substance, for example a silicone resin solution or emulsion, in order to make at least the layer of cellulose which is intended to be placed next to the wound hydrophobic.

The particular advantage of the bandaging material according to the invention lies in the fact that it can be easily and cheaply produced because the acrylic coating can be applied by imprinting with an acrylic resin emulsion containing the above-mentioned germ-killing or controlling substances. Imprinting is, of course, considerably cheaper than other processes of impregnation, especially high vacuum deposition by evaporation on the surface of the bandaging material.

Apart from the metal oxides and metal powders mentioned above, the acrylic resin coating may contain as the germ-killing or controlling substance organic therapeutic substances such as disinfectants and antibiotics, for example sulphonamide.

The individual particles of the germ-killing or controlling substance are embedded in the layer of acrylic resin and do not therefore in themselves constitute a continuous coating; the fact that the individual particles are embedded in the acrylic resin

layer gives [illegible]er flexibility to the bandaging material.

Where an absorbent backing material is employed, this may be cellulose cotton-wool or cotton fleece. The backing material can be joined to the bandaging material in a manner known in itself, for example in the case of bandaging materials of thermoplastic fibres by welding, otherwise by sticking or stitching. If they are joined by stitching, it is expedient for this to be done with hydrophobic threads which have themselves been separately treated with the corresponding acrylic resin dispersion.

The following Examples serve to illustrate the present invention in more detail, without its being however confined to them.

EXAMPLE 1

A fleecy material of polyamide fibres of 2.5 den and a thickness of 0.07 mm, thermally woven, was imprinted with a polyacrylisobutylester dispersion to form a discontinuous (i.e. porous) resin layer. The dispersion used was composed as follows:

Polyacrylisobutylester	15 parts weight
Zinc oxide	15 " "
Water	69 " "
Commercial dispersing agent	1 " "

The bandaging material thus obtained was backed with an absorbent layer of fleecy rayon jersey, thickness 10 mm, weight per square metre 360 g, and joined to the absorbent layer by quilting-type welding seams. In this way a bandaging material was obtained which, as experiments showed, did not adhere to the wound and did have a distinct therapeutic effect on the wound.

EXAMPLE 2

The procedure was the same as in Example 1 but an acrylic resin dispersion composed as follows was used:

Polyacrylisobutylester	15 parts weight
Aluminium powder	10 parts weight
Water	74 parts weight
Commercial dispersing agent	1 part weight

The imprinted fleecy material was backed with a layer of cellulose cotton-wool, approximately 5 mm thick, with a weight per square metre of 240 g, and quilted together with polyamide thread which had itself been passed through the same dispersion that was used for the imprinting process. The bandaging material backed in this way also showed exceptional therapeutic properties. The rate of imprinting amounted to 50 m per minute.

EXAMPLE 3

The procedure according to Example 1 was repeated but an acrylic resin dispersion composed as follows was used:

Polyacrylisobutylester	15 parts weight
1% by weight water solution of Phenyl mercury borate	10 parts weight
Water	75 parts weight

The fleecy material was imprinted at a rate of 50 m per minute; further treatment followed as described in Example 2. The bandaging material obtained showed exceptional therapeutic properties; in no case did it adhere to the wound.

EXAMPLE 4

A 2-layer width of cellulose, 22 g per square metre, is passed through an immersion bath and impregnated with an acrylic resin dispersion. The superfluous impregnating agent is pressed out and the width of cellulose passed over a number of dry cylinders at a temperature of 120° C.

The impregnated width of cellulose produced in this way is then embossed by means of an embossing cylinder heated to 110°C, the ends of the shaft being weighted with 4 to 6 tons. The embossing may be made so deep that the width of cellulose is pierced with pore-like perforations (or small slits). This is done to increase permeability to moisture.

A discontinuous (i.e. porous) resin layer was applied by imprinting the chemically treated width of cellulose with a polyacryl-isobutylester dispersion containing zinc oxide. The dispersion used is composed as follows:

Polyacryl-Isobutylester	15 parts weight
Zinc oxide	15 parts weight
Water	69 parts weight
Dispersing agent	1 part weight

The bandaging material was backed with a layer of absorbent fleecy material. The bandaging material obtained in this way does not adhere to the wound and has a therapeutic effect.

EXAMPLE 5

The procedure was the same as in Example 4 but an acrylic resin dispersion composed as follows was used for the imprinting process:

Polyacryl-Isobutylester	15 parts weight
Aluminium powder	10 parts weight
Water	74 parts weight
Dispersing agent	1 part weight

The bandaging material obtained was backed with a layer of cellulose of 5 mm thickness and 140 g weight per square metre, to which it was attached by embossing.

This bandaging material also showed ex-

ceptional therapeutic properties. The rate of imprinting amounted to 50 m per minute.

EXAMPLE 6

According to the process described in Example 4, an acrylic resin dispersion composed as follows was used:

Polyacrylisobutylester	15 parts weight
1% by weight water solution of Phenyl mercury borate	10 parts weight
Water	75 parts weight

In the present case, however, the embossing which preceded the imprinting was omitted; the impregnated width of cellulose was imprinted on both sides, at a rate of 50 m per minute for each side. In this case too, a bandaging material with exception therapeutic properties was obtained.

EXAMPLE 7

First, the procedure described in the first paragraph of Example 4 was followed, but using a single-layer width of cellulose, backed with a fibrous gauze of polyamide fibres, 2.5 den and having a thickness of 0.07 mm. After the impregnating dispersion had been pressed out, a bandaging material was obtained which was imprinted directly on the cellulose side with the dispersion described in Example 4, omitting the embossing stage. The bandaging material obtained in this way shows, in addition to its therapeutic properties, exceptional stability especially when wet.

In the above Examples the imprinting itself was carried out by screen-printing.

WHAT WE CLAIM IS:—

1. Bandaging material comprising one or more layers of cellulosic material coated on the side for placing next to the wound with a porous non-adhesive layer of acrylic resin which contains a substance which kills or controls the growth of germs, the layer or layers of cellulosic material being backed with an absorbent or strengthening layer.

2. Bandaging material according to claim 1 in which the germ-killing or controlling substance comprises one or more of zinc oxide, aluminium oxide, aluminium powder and silver powder.

3. Bandaging material according to claim 1 or 2 having a layer of cellulosic material impregnated with acrylic resin or silicone resin.

4. Bandaging material comprising one or more layers of fleecy material coated on the side for placing next to the wound with a porous non-adhesive layer of acrylic resin which contains a substance which kills or controls the growth of germs, the layer or layers of fleecy material being backed with an absorbent or strengthening layer.

5. Bandaging material according to claim 4 in which the germ-killing or controlling substance comprises one or more of zinc oxide, aluminium oxide, aluminium powder and silver powder.

6. Bandaging material according to claim 4 or 5 wherein the fleecy material comprises cellulosic material.

7. Bandaging material according to any preceding claim comprising a layer of fleecy material which comprises a reinforced fibrous gauze, of thickness 0.02 to 0.05 mm and weight per square metre 12 to 60 g, of hydrophilic and/or hydrophobic fibres of 1.5 to 15 den.

8. Bandaging material according to claim 7 in which the fibres of the fibrous gauze comprise siliconised cellulosic fibres.

9. Bandaging material substantially as described in Example 4 or 5 herein.

10. Bandaging material substantially as described in any of the Examples 1 to 3, 6 and 7 herein.

11. Process for the production of a bandaging material in which one or more layers of cellulosic material are coated on a side for facing the wound with an acrylic resin dispersion which contains a substance which kills or controls the growth of germs to form a porous non-adhesive acrylic resin layer containing the said substance, the coated bandaging material being backed with a layer of absorbent or strengthening material.

12. Process according to claim 11 in which the layer or layers of cellulosic material are impregnated with an acrylic resin or silicone resin before coating with the acrylic resin dispersion.

13. Process according to claim 11 or 12 in which the germ-killing or controlling substance comprises one or more of zinc oxide, aluminium oxide, aluminium powder and silver powder.

14. Process for the production of a textile bandaging material in which one or more layers of fleecy material are coated on a side for facing the wound with an acrylic resin dispersion which contains a substance which kills or controls the growth of germs to form a porous non-adhesive acrylic layer containing the said substance, the coated bandaging being backed with a layer of absorbent or strengthening material.

15. Process according to claim 14 wherein the fleecy material comprises cellulosic material.

16. Process according to claim 15 in which the layer or layers comprising cellulosic material are impregnated with an acrylic resin or silicone resin before coating with the acrylic resin dispersion.

17. Process according to any of claims 14 to 16 in which the germ-killing or con-

trolling substance comprises one or more of zinc oxide, aluminium oxide, aluminium powder and silver powder.

18. Process according to any of claims 14 to 17 in which the layer or layers comprise a fleecy layer in the form of a reinforced fibrous gauze, of thickness 0.02 to 0.05 mm and weight per square metre 12 to 60 g. of fibres of 1.5 to 15 den.

19. Process for the production of bandaging material substantially as described

20. Process for the production of bandaging material substantially as described in any one of Examples 1 to 3, 6 and 7 herein.

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